The Government Printing Office, Washington, D. C., has only recently distributed to libraries: *Aeronautics, Third Annual Report of the National Advisory Committee for Aeronautics 1917*, which was published in 1918. It is a volume of nearly five hundred royal octavo pages and many plates, and contains twenty-three reports. Report 21, "Theory of an airplane encountering gusts, II" by Professor E. B. Wilson, of Massachusetts Institute of Technology, occupies pages 403–431, and is in continuation of his report published in the first annual report of the Committee.

"In speaking of *time* as a fourth dimension to space, have not our mathematicians been guilty of a carelessness in language which they would be the last to tolerate in symbols? They are always careful to associate $(x, y, z)$ not with $t$ but with $ct$, where $c$ is the velocity of light. The fourth dimension is not *time* at all, but *distance travelled*, otherwise these same mathematicians would say its dimensions were wrong. Or if it is preferred to use time, then we must divide $(x, y, z)$ by $c$, which comes to measuring distances in light-years before we can associate them with time.

"A further protest against the rather unnecessary mystification of the layman may not carry quite so much weight; but all the same let it be made. Is it vital to use imaginary time in our language and our thoughts? As a piece of mathematical mechanism it may be useful to treat a hyperbola $x^2 - y^2 = 1$, as a particular case of a circle $x^2 + y^2 = 1$; but it is surely straining our powers of conception needlessly to talk of the hyperbola as a particular case of the circle, except for the purpose of obtaining results quickly by the methods of projective geometry. The 'rigid body rotation' invoked for the transformation of $dx^2 + dy^2 + dz^2 - c^2dt^2$ calls up a false image in some of our minds: it is really a simple distortion with which we have to do, and could not this be mentioned in a cautionary way?"—From *The Observatory*, April, 1920, volume 43, page 171.

## ARTICLES IN CURRENT PERIODICALS.

**AMERICAN JOURNAL OF SCIENCE,** volume 49, May, 1920: "The mathematics of isostasy" I by I. C. Chamberlain, 311–318, II by W. D. MacMillan, 318–323.

**JOURNAL OF THE INDIAN MATHEMATICAL SOCIETY,** volume 11, no. 6, December, 1919 (published May, 1920): "International Congress of Mathematicians," 201–202; "Computation of the ephemeris of a planet and a comet" by R. N. Apte, 203–218; "An extension of Feuerbach's theorem" by M. Bhimasena Rao, 219–227; "To find a cube the sum of whose divisors is a perfect square" by N. B. Mitra, 228–229; Note on a continued fraction by K. B. Madhava, 230–234; "Astronomical notes," 235–236; Problems and solutions, 237–240.

**JOURNAL OF THE WASHINGTON ACADEMY OF SCIENCES,** volume 10, no. 2, Jan. 19, 1920: "A trigonometric computer" by F. E. Wright, 29–31.—No. 7, April 4: "A graphical method for plotting reciprocals" by F. E. Wright, 185–188.

**MATHEMATICAL GAZETTE,** volume 10, May, 1920: "The graphical treatment of differential equations" (continued) by S. Brodetsky, 49–60; "Ratio and proportion" by D. K. Picken, 60–62; "Gleanings from far and near," 62, 74; "Geocentric parallax" by A. A. Krishnaswami Aiyangar, 63–64; "A graphical treatment of simple harmonic motion" by W. G. Bickley, 64–65; "A trigonometrical lucubration" by R. F. Muirhead, 66–68; "Some incidental writings by De Morgan" (continued), 69–74; Review by J. M. Child of W. N. Rose's *Mathematics for Engineers* (London, 1920), 75–76; Review by A. Dakin of C. de la Vallée Poussin's *Leçons sur l'approximation des fonctions d'une variable réelle* (Paris, 1919), 76–77; Review by G. H. Hardy of Petrovitch's *Les spectres numériques* (Paris, 1919), and J. L. S. Hatton's *Theory of the Imaginary in Geometry*, 77–79; "Books received, contents of journals, etc.," i–iv.

**MESSENGER OF MATHEMATICS,** volume 49, no. 5, September, 1919: "On some series whose $n$th term involves the number of classes of binary quadratics of determinant $-n$" by L. J. Mordell, 65–72; "A note on a theorem of Riemann's" by Grace C. Young, 73–78; "The twelve elliptic functions related to sixteen doubly periodic functions of the second kind" by E. T. Bell, 78–80—October: "The twelve elliptic functions related to sixteen doubly periodic functions of the second kind" (concluded) by E. T. Bell, 82–84; "Notes on some points in the integral calculus (lii)" by G. H. Hardy, 85–90; "A new integral equation satisfied by the solution of a certain linear differential equation, which occurs in the theory of electrical oscillations and of the tides" by E. G. C. Poole, 91–96.

**NATURE**, volume 105, May 13, 1920: "Differential geometry" [review of R. H. Fowler's *The Elementary Differential Geometry of Plane Curves* (Cambridge, 1920)] by G. B. M[athews], 321–322—May 20: "Relativity and Geometry" [review of E. Freundlich's *The Foundations of Einstein's Theory of Gravitation*, translated by H. L. Brose (Cambridge, 1920)] by E. Cunningham, 350–351; "A new method for approximate evaluation of definite integrals between finite limits" by A. F. Dufton, 354–355 ["An approximate evaluation of $\int_0^1 F(x)dx$ is $\cdots\frac{1}{4}\{F(\frac{1}{10}) + F(\frac{4}{10}) + F(\frac{6}{10}) + F(\frac{9}{10})\}$"].—June 3: "A new method for approximate evaluation of definite integrals between finite limits" by C. F. Merchant, 422 ["The subject has a particular interest for naval architects, inasmuch as the majority of calculations relative to displacement, stability, strength, etc., of ships involve the finding of areas and volumes bounded by curved lines and surfaces.

The particular rule enunciated by Mr. A. F. Dufton in *Nature* of May 20 has been in use at this [Royal Naval] College for some years, and gives very accurate results in obtaining areas and volumes, and also, by a further application, the positions of their centers of gravity . . ..

An interesting paper dealing with this subject and giving a great variety of rules for approximate integration was read at the Institution of Naval Architects in 1908 (*Trans. I. N. A.*, Vol. 1) by Sir W. S. Abell entitled "Two notes on ship calculations."]

**LA NATURE**, volume 48, May 8, 1920: "Un nouvel appareil enregistreur pour l'étude des lois de la dynamique et la composition des mouvements vibratoires" by Paul Bud, 230–234—May 15: "Le centenaire de la machine à calculer industrielle" by L. Reverchon, 249–252; "Il y a quinze ans (27 août 1904) *La Nature* donnait un important et substantiel article de M. Maurice d'Ocagne sur les machines à calculer. L'auteur passait successivement en revue les additionneurs avec ou sans touches, les appareils à multiplier par additions successives et par application du principe des tables de Pythagore, les machines à différences spécialement employées à la construction des tables et les machines algébriques et analytiques dont quelques unes sont extraordinairement compliquées.

On pouvait lire dans cet article les lignes suivantes: 'C'est au financier alsacien Thomas, de Colmar, que revient sans conteste le très grand mérite d'avoir réalisé la première machine à multiplier et à diviser rapide, robuste et fonctionnant en toute sûreté. C'est en 1820 que Thomas créa son Arithmomètre dont depuis lors, le type n'a cessé de se perfectionner sous la direction du constructeur Payen. Très répandu dans les grands établissements financiers, il a fourni une carrière qui a depassé aujourd'hui trois quarts de siècle, attestant de hautes qualités pratiques.'" The article contains a portrait of Thomas, of Blaise Pascal, "inventeur de la premiere machine à calculer," and of Léon Ballée, "a 19 ans, manipulant une machine à calculer."]

**NOUVELLES ANNALES DE MATHÉMATIQUES**, volume 79, February, 1920: "Sur le maximum et le minimum des fonctions de deux variables" by G. Valiron, 41–50; "Equation angulaire d'un conoïde droit. Application au cylindroide envisagé dans ses rapports avec la distribution des courbures autour d'un point d'une surface" by M. d'Ocagne, 51–55; "Sur les contacts des sphères tangentes à quatre plans" by V. Thébault, 55–59;" A propos de la transformation par tangentes orthogonales" by F. Balitrand, 59–60; "Certificats de calcul différentiel et intégral," 60–73; "Chronique," and "Questions," 76–80—March: "Exposé élémentaire d'une théorie rigoureuse des liaisons finies unilatérales" by E. Delassus, 81–93; "Sur les polygones harmoniques d'un nombre pair de cotés et sur certains cercles du triangle" by V. Thébault, 94–100; "Sur les tangentes aux trajectoires des sommets d'un triangle qui se déforme dans un plan," by R. Goormaghtigh, 100–102; "Chronique," 103–105; "Certificats de calcul différentiel et intégral" 105–117; "Questions," 117–120—April: "Sur l'application de la loi de Gauss à la position probable d'un point dans le plan ou dans l'espace" by J. Haag, 121–142; "Sur un théorème de Cornu relatif aux caustiques" by T. Lemoyne, 142–145; "Chronique," 145–147; "Bibliographie," "Certificat d'astronomie," "Certificat de physique mathématique," "Questions," 147–160.

**PROCEEDINGS OF THE LONDON MATHEMATICAL SOCIETY**, series 2, Vol. 19, part 1, June, 1920: "Groups involving three and only three operators which are square" by G. A. Miller, 51–56.

**PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES**, volume 6, no. 4, April, 1920: "The starting of a ship" by J. K. Whittemore, 182–185; "A thermodynamic study of electrolytic solutions" by F. L. Hitchcock, 186–197; "Functionals invariant under one-parameter continuous groups of transformations in the space of continuous functions" by I. A. Barnett, 200–204.

**REVUE DE L'ENSEIGNEMENT DES SCIENCES**, volume 14, January–February, 1920: "Elimination d'une inconnue entre plusieurs équations" by M. Stuyvaert, 1–6; "Apropos de la notion

d'aire vectorielle d'un contour gauche" by G. Bouligand, 6–9; "La transformation apsidale et le problème de Monge" by F. Meyer, 9–14; Sur le volume engendré par un triangle en tournant autour d'un axe" by J. Juhel-Rénoy, 14–17; "Résolution graphique de l'équation $a \cos x + b \sin x = c$" by H. Girard, 17–20; "Ecole Normale Supérieure (1919), concours spécial," "Ecole Polytechnique (1919), concours spécial," etc. 29–48.

**Revue de Mathématiques Spéciales,** volume 13, no. 6, March, 1920: "Résolution de l'équation du 3e degré" by P. Maurice, 129–131; [solutions of problems in analytic and descriptive geometry], 131–139, 141–149; [Questions proposed in oral examinations at the Ecole Polytechnique, Ecole Centrale, etc.], 139–140, 149–152—No. 7, April: "Resolution de l'équation du 3e degré" (conclusion) by P. Maurice, 153–155; [Solutions of problems in algebra and analytic geometry], 155–162, 167–173—No. 8, May: "Note sur les déterminants" by E. Pouget, 177–183; Questions, Ecole Normale Supérieure et Bourses de Licence, concours spécial pour les démobilisés de 1919," 184–187; [Solutions of problems in algebra and analysis, analytic and descriptive geometry], 187–196.

**Revue générale des Sciences,** volume 31, April 15, 1920: "Les bases de la théorie de la relativité" by E. Guillaume, 200–210—May 15: [description of F. E. Wright's [April] article in the *Journal of the Washington Academy of Sciences*, see above], 266; Review by E. Cartan of Veblen and Young's *Projective Geometry* (Boston, 1916–17), 286.

**Revue Scientifique,** volume 58, April 24, 1920: "Le bicentenaire de John Flamsteed" by E. Doublet, 237–240.

**School Science and Mathematics,** volume 20, no. 5, May, 1920: "Calculation by geometry of astronomical distances" by J. V. Collins, 416–418; "The character of the roots of a quadratic equation" by R. E. Moritz, 433–434; "Plus and minus signs in algebra" by J. A. Nyberg, 435–437; "The claims of mathematics as a factor in education" by C. N. Moore, 438–442; "Some applications of the project method in high school mathematics" by Edith S. Eaton, 443–447; "The math quest" by Helen Whitaker, 457–459; "The Theorem of Nicomachus" by O. Schmiedel, 462–465; Problem department, 465–467—No. 6, June: "Talk on logarithms and slide rules" by F. Cajori, 527–530; "Freshman college mathematics" by E. E. Watson [Chairman of a committee of the Iowa Association of Mathematics Teachers], 531–538; "Time, rate and distance problems" by J. A. Nyberg, 539–544; "Some applications of the various forms of zero and unity" by R. Morris, 544–548; Problem department, 554–556.

**Scientia,** volume 27, February, 1920: Review by G. Loria of T. R. Running's *Empirical Formulas* (New York, 1917), 159–161.

**Sepiad,** Brown University, volume 20, May, 1920: "Mathematical nightmare" by Marion E. Stark, 32–33 [First two of five stanzas:

"Quite oft when I slumber by night-time,
But not when I slumber by day,
I find myself deep in a woodland
Where tiny lost triangles stray.

Hyperboloids, one or two-sheeted,
Like ghosts flit about me in pairs;
A catenoid mews in the branches,
And helices creep from their lairs."]

**Texas Mathematics Teachers' Bulletin,** volume 5, no. 3, May 10, 1920: "Looking forward," by J. W. Calhoun, 5–7; "A proposed statistical study of high school grades" by E. L. Dodd, 8–10; "The teaching of elementary algebra" by H. J. Ettlinger, 11–13; "Mathematics in the [University of Texas] summer school," 14–18; "The reorganization of the first courses in secondary school mathematics," 19–33 [a preliminary report by the National Committee of Mathematical Requirements including a letter by J. W. Young]; "The straight edge," 34.

**Unterrichtsblätter für Mathematik und Naturwissenschaften,** volume 26, nos. 1–2, February, 1920: "Ueber die Verwendung der Logarithmentafel im Schulunterricht" by R. Neuendorff, 12–13; "Beziehungen zwischen dem Dreieck, seinem Ankreis- und Fusspunktdreieck und ihre Anwendung zur Herleitung von Formeln für die trigonometrischen Funktionen der Dreieckswinkel" by S. Frühling, 13–18; "Ueber das einem gegebenen Kreissegment eingeschriebene grösste Rechteck und sein räumliches Analogen" by W. Gaedecke, 18–20.

**Zeitschrift für mathematischen und naturwissenschaftlichen Unterricht,** volume 51, nos. 2–3, March 30, 1920: "Eine neue Definition der stetigen Teilung" by O. Zander,

41–45; "Die Perspektivität im geometrischen Unterricht der OII" by M. Enders, 46–51; "Die Kegelschnitte als Kreisprojektion" by J. Arneberg, 52–57; "Die Exponentialfunktion im Unterricht" by E. Götting, 58–62; "Kleine Mitteilungen," 62–65; "Aufgaben-repertorium," 65–71; "Bücher Besprechungen," 71–87 [not all of the books are mathematical.]

---

## UNDERGRADUATE MATHEMATICS CLUBS.

EDITED BY U. G. MITCHELL, University of Kansas, Lawrence.

### CLUB ACTIVITIES.

The attention of our readers is called to the fact that among the clubs reported this month are two which have not before been listed by the Department. One of these, "The Pascal Circle" of Trinity College, Washington, D. C., has been organized for four years. The other, "The Square" of Washington Square College, New York University, is, so far as the writer is aware, the most recently organized club having begun its activities in February of this year.

### MATHEMATICS CLUB OF COLUMBIA UNIVERSITY, New York, N. Y.

[*1918*, 227–228; *1919*, 262.]

Officers 1919–1920: President, Joseph Feldt '21; vice-president, Barclay V. Heuill '21; secretary, Albert E. Meder, Jr., '22; faculty adviser, Professor Lewis P. Siceloff. These officers constituted the program committee.

The average attendance at meetings during the year was twenty-five. The programs were as follows:

October 31, 1919: "Geometric inversions" by Albert E. Meder '22.
November 21: "Cardinal numbers" by Joseph Feldt '21.
December 5: "The catenary and the suspension bridge" by Barclay V. Heuill '21.
December 17: "The Newtonian theory" by Israel Koral '20.
January 9, 1920: "What is a point?" by Professor Cassius J. Keyser.
February 13: "The history of mathematics in Columbia University" by Professor Thomas S. Fiske, chairman of the department of mathematics.
February 27: "How tables of logarithms are made" by Edward H. Reimer '22.
March 12: "The Einstein theory" by Doctor Kenneth W. Lamson of Barnard College.
March 26: "Origins of the calculus" by Oscar Bodansky '22.
April 9: "Famous problems in the history of mathematics" by Professor David Eugene Smith, president of the Mathematical Association of America.
April 21: "The number $\pi$" by Frank Frink, Jr., '22.
May 7: "The geometry of the cubic equation" by Professor Henry B. Mitchell.

### THE PASCAL CIRCLE, TRINITY COLLEGE, Washington, D. C.

An undergraduate Mathematics Club was organized at Trinity College, Washington, D. C., under the name of the "Pascal Circle," in 1916, to give